

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A persistent p-type group II-VI semiconductor material comprising a thin film of a single crystal group II-VI semiconductor comprising atoms of group II elements and atoms of group VI elements, wherein the group II-VI semiconductor is doped with a p-type dopant selected from phosphorus, arsenic, antimony, bismuth, copper, and chalcogenides of the foregoing, and mixtures thereof, wherein the p-type dopant concentration is sufficient to render the group II-VI semiconductor material in a single crystal form, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about 0.1 cm²/V·s, and wherein the p-type group II-VI semiconductor material has a luminescent peak at about 3.357 eV.
2. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the group II elements are selected from zinc, cadmium, alkaline earth metals, and mixtures thereof.
3. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the group VI elements are selected from oxygen, sulfur, selenium, tellurium, and mixtures thereof.
4. (canceled).
5. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the resistivity is less than about 0.1 ohm·cm.
6. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the resistivity is less than about 0.01 ohm·cm.
7. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the resistivity is less than about 0.001 ohm·cm.
8. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the carrier mobility is greater than 0.5 cm²/V·s.

9. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the carrier mobility is greater than $4 \text{ cm}^2/\text{V}\cdot\text{s}$.

10. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the p-type dopant concentration is in the range from about 10^{16} to about 10^{22} atoms/ cm^3 .

11. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the p-type dopant concentration is greater than about $10^{16} \text{ atoms}\cdot\text{cm}^{-3}$.

12. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the p-type dopant concentration is in the range from about 10^{17} to 10^{19} atoms/ cm^{-3} .

13. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the group II-VI semiconductor material is deposited as a thin film on an amorphous self supporting substrate surface.

14. (currently amended) A persistent p-type zinc oxide semiconductor material comprising single crystal zinc oxide that is doped with a quantity of arsenic, wherein the arsenic concentration is sufficient to render the zinc oxide a p-type semiconductor in a single crystal form, wherein semiconductor resistivity is less than about $0.5 \text{ ohm}\cdot\text{cm}$, and wherein the carrier mobility is greater than about $0.1 \text{ cm}^2/\text{V}\cdot\text{s}$, and wherein the p-type zinc oxide semiconductor material has a luminescent peak at about 3.357 eV.

15. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the resistivity is less than about $0.1 \text{ ohm}\cdot\text{cm}$.

16. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the resistivity is less than about $0.01 \text{ ohm}\cdot\text{cm}$.

17. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the resistivity is less than about $0.001 \text{ ohm}\cdot\text{cm}$.

18. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the carrier mobility is greater than $0.5 \text{ cm}^2/\text{V}\cdot\text{s}$.

19. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the carrier mobility is greater than $4 \text{ cm}^2/\text{V}\cdot\text{s}$.

20. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the arsenic concentration is in the range from about 10^{16} to about 10^{22} atoms·cm⁻³.

21. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the arsenic concentration is greater than about 10^{16} atoms·cm⁻³.

22. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the arsenic concentration is in the range from about 10^{17} to 10^{19} atoms·cm⁻³.

23. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the zinc oxide is deposited as a thin film on an amorphous self supporting substrate surface.

24. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the zinc oxide further comprises cadmium oxide.

25. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the zinc oxide further comprises magnesium oxide.

26. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the zinc oxide is a non-stoichiometric zinc oxide compound.

27. (currently amended) A persistent p-type zinc oxide semiconductor material comprising single crystal zinc oxide that is doped with a quantity of a antimony, wherein the antimony concentration is sufficient to render the zinc oxide a p-type semiconductor in a single crystal form, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about $0.1 \frac{\text{cm}^2}{\text{V}\cdot\text{s}}$.

28. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the resistivity is less than about 0.1 ohm·cm.

29. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the resistivity is less than about 0.01 ohm·cm.

30. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the resistivity is less than about 0.001 ohm·cm.

31. (canceled).

32. (canceled).

33. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the antimony concentration is in the range from about 10^{16} to about 10^{22} atoms·cm⁻³.

34. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the antimony concentration is greater than about 10^{16} atoms·cm⁻³.

35. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the antimony concentration is in the range from about 10^{17} to 10^{19} atoms·cm⁻³.

36. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the zinc oxide is deposited as a thin film on an amorphous self supporting substrate surface.

37. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the zinc oxide further comprises cadmium oxide.

38. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the zinc oxide further comprises magnesium oxide.

39. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the zinc oxide is a non-stoichiometric zinc oxide compound.

40. (canceled).

41. (canceled).

42. (canceled).

43. (New) A persistent p-type zinc oxide semiconductor material comprising single crystal zinc oxide that is doped with a quantity of phosphorous, wherein the phosphorous concentration is sufficient to render the zinc oxide a p-type semiconductor in a single crystal form, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about 0.1 cm²/V·s, and wherein the p-type zinc oxide semiconductor material has a luminescent peak at about 3.357 eV.

44. (New) A persistent p-type zinc oxide semiconductor material according to claim 43, wherein the resistivity is less than about 0.001 ohm·cm.

45. (New) A persistent p-type zinc oxide semiconductor material according to claim 43, wherein the carrier mobility is greater than 4 cm²/V·s.

46. (New) A persistent p-type zinc oxide semiconductor material according to claim 43, wherein the arsenic concentration is in the range from about 10^{16} to about 10^{22} atoms·cm⁻³.

47. (New) A persistent p-type zinc oxide semiconductor material according to claim 43, wherein the zinc oxide further comprises cadmium oxide.

48. (New) A persistent p-type zinc oxide semiconductor material according to claim 43, wherein the zinc oxide further comprises magnesium oxide.